SOME COMMON EDIBLE AND POISONOUS MUSHROOMS

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THE terms *mushroom* and *toadstool* are used by many collectors to designate respectively *edible* and *poisonous* species. Such a distinction is not recognized by the scientist. The two words are correctly used interchangeably, though *mushroom* is usually preferred. Mushrooms, as commonly thought of, have a characteristic umbrella shape. The handle is termed the *stem*, the expanded top the *cap*. The stem may be attached at the center of the cap or at one side or it may be absent. On the undersurface of the cap and radiating from the stem, as the spokes of a wheel from the hub, are numerous, prominent, flat, knife-blade like plates called *gills*. On the surface of the gills are produced a countless number of minute *spores*, which are analogous to seeds of green plants. Though these spores are much too small to be seen by the unaided eye, they fall from the gills in such large numbers that they accumulate as a visible powder. The color of this spore powder is always the same in any given species of mushroom. To determine whether a form is edible or poisonous, one must know the color. In the well-known cultivated mushrooms this spore powder is purplish brown, while in the deadly poisonous species of *Amanita* it is white.

If the cap of a freshly collected mature mushroom be placed gill-side down on a sheet of paper, the falling spores soon accumulate on the paper between the edges of the gills in radiating lines forming an attractive *spore print* in which the color is unmistakable. While the spores are falling, the cap should be covered by an inverted dish to provide still air conditions. In nature, the extremely light spores drift away easily in air currents and are widely disseminated. The spores fall to the ground and germinate at the surface of the soil, forming in the humus a tangled mass of slender threads which the mushroom grower calls *spawn*. These threads are the vegetative, or feeding, portion of the mushroom. The prominent umbrella-shaped body aboveground is merely the fruit body. It forms at the tip of one of the coarse threads composing the spawn, and in the young condition is known to the grower as a *button*. The button commonly originates somewhat beneath the surface of the ground, and in the beginning is very small and more or less spherical. With increase in size the various parts of the mature mushroom

begin to take form in its interior. At maturity the stem elongates rapidly, elevating the cap well aboveground. Finally, the cap opens out into the horizontal position giving the open umbrella shape.

Most mushrooms grow on the ground, but a goodly number also occur on wood. Mushrooms belong to the large group of plants known as the *fungi*. Other fungi besides mushrooms are edible. There are polypores (figure 7), which have pores on the underside of the cap in place of gills; the coral fungi (figure 8), which are usually branched in a tree-like fashion and resemble coral; the morels (figure 10) whose cap is pitted on the upper surface and looks like a sponge; and the puff-balls (figure 9), round bodies which when young have a homogeneous white appearance inside and when old are completely filled with a brown mass of spore dust.

The only way to be sure whether a mushroom is poisonous or edible is to be able to recognize it on sight as one would a violet, a rose, or a lily. There is no dependable test, such as the "silver spoon test" or the "peeling of the cap," that will enable an inexperienced person to distinguish poisonous from edible forms.

Some general rules for mushroom collectors are the following: Never eat a mushroom until you are sure of its identity. Be sure all mushrooms collected are fresh. In general, do not use brightly colored forms, for some of these are somewhat poisonous. Reject all forms that have a cup around the base of the stem. View with suspicion all forms with white gills or white spore dust. Use great care not to pick any mushrooms in the early button stage, since in that condition all the distinguishing characters are not yet well developed.

The purpose of this bulletin is to describe a few of the common edible forms, which, at the same time, are among the easiest to identify. If one can master these and cares to learn more, many books, scientific and popular, describe and illustrate numerous other forms. One of the most outstanding of these is *Studies of American Fungi. Mushrooms: Edible, Poisonous, Etc.*, by George Francis Atkinson. Most of the illustrations in this bulletin are copied from those in that book. More recently published and more readily obtainable books include: *Mushrooms and Toadstools,* by H. T. Güssow and W. S. Odell; *The Mushroom Handbook,* by Louis C. C. Krieger; *Common Edible Mushrooms,* by Clyde M. Christensen; *Field Book of Common Gilled Muchrooms,* by William Sturgis Thomas; *Mushrooms of Eastern Canada and the United States,* by René Pomerleau; and *The Mushroom Hunter's Field Guide* by Alexander H. Smith.

The Common Field Mushroom

(Agaricus campestris)

Anyone familiar with the commercial mushroom should be able to identify this wild form *(Agaricus campestris)*, for it is nearly identical with the commercial form in shape, size, and color (figure 1). The common field mushroom is found in pastures and grassy places, especially if the ground has been richly manured. It usually grows in groups, but occasionally is single. From August until frost it is common when rainfall is plentiful.

The cap is from 1½ to 4 inches wide; hemispherical at first, and expanded at maturity. The surface in young plants is nearly smooth, presenting a soft, silky appearance. As the plant becomes older, the surface may be torn into small triangular scales. Usually the color is white, but varies to light brown, especially in the scaly forms, where the scales may be prominent and dark brown in color. The flesh is white.

In the young plant, a thin membrane, called the *inner veil* stretches from the edge of the cap to the stem and hides the gills from sight. As the umbrella opens, the expansion of the cap ruptures the veil which then hangs in a ring, the *annulus*, around the stem.

The gills in the button stage are white. They soon turn pink and, when the cap expands and breaks the veil, they become dark-brown to purplish black. They are free from the stem.

The stem, from 2 to 3 inches long and from ½ to 2/3 inch thick, is cylindrical, white, and solid throughout.

FIGURE 1. Agaricus campestris

Button and mature stages are illustrated. Note the annulus, the dark colored gills, and the scaly surface. The cover illustration also shows this species

FIGURE 2. Lepiota naucina
The plants are entirely white and possess an annulus and white gills which later may become dull pink

The Smooth Lepiota
(Lepiota naucina)

The Smooth Lepiota is often confused with the common field mushroom (*Agaricus campestris*) because of its similarity in shape and size and because both occur at the same time of the year in the same sort of places (figure 2). The Smooth Lepiota is also a favored edible form.

The cap, from 1½ to 4 inches broad, is soft, fleshy, and smooth. At first it is hemispherical, but at maturity becomes nearly flat. The color is typically white to buff.

The gills are free from the stem and white in color, later becoming dull pinkish and tending to turn brownish when dry. The stem is from 2 to 4 inches long and from ¼ to ½ inch thick. Around the stem is a rather prominent white ring, or annulus, which in old specimens may be movable on the stem.

This form might also be confused with *Amanita verna*, the Destroying Angel, especially since the base of the stem is often considerably enlarged, but the Smooth Lepiota has no death cup.

The Inky Cap Mushrooms
(Coprinus)

The Inky Cap mushrooms are readily distinguished by their black spores and by the gills which at maturity dissolve into an inky fluid. There are several well-known common species. They can be eaten only while the gills are white; that is, before they begin to dissolve into the inky fluid.

FIGURE 3. Coprinus comatus
The cap does not open to the horizontal position

The Shaggy-Mane
(Coprinus comatus)

The Shaggy-Mane, one of the best known of mushrooms, is especially tasty and easy to identify (figure 3). It is common on lawns, in gardens, and in dumping grounds throughout the autumn until after hard frosts. It grows singly or in clusters.

The cap is from 2 to 5 inches long, at first slender egg-shaped, later becoming bell-shaped as the gills dissolve and disappear. Light-brown scales, usually arranged in concentric bands, adorn the cap. The flesh underneath shows through white or pink. The shaggy nature of the cap is distinctive. The stem is from 3 to 7 inches long, smooth to silky, and white in color. The gills are not attached to the stem. They are white, tinged with pink, changing to purplish black, and finally dissolve into an inky mass.

The Glistening Coprinus
(Coprinus micaceus)

The Glistening Coprinus is most often found in great clusters around stumps, trees, fence-posts, or about decayed buried wood (figure 4). It reappears over and over in the same place after rains throughout the spring and fall. This Coprinus is an excellent edible mushroom, and its abundance compensates for the small size of the individual fruit bodies. They dissolve and dissappear so quickly, however, it is necessary to collect and use them promptly.

The cap is from 1½ to 2½ inches broad and is bell-shaped at maturity. The surface of the cap is evenly and closely furrowed, or striate. The color is tan or light-buff, but becomes darker with age. Small particles, which glisten like ground mica, cover the surface, and make appropriate the name *Glistening Coprinus.*

The hollow fragile stem, from 2 to 3 inches long, has a silky appearance. It is white to pale tan.

FIGURE 4. Coprinus micaceus
Note the striations on the surface of the cap, and the black gills

FIGURE 5. Coprinus atramentarius

The Inky Cap

(Coprinus atramentarius)

The Inky Cap, common on lawns and in gardens from August until late frosts, grows singly or in dense clusters (figure 5). The cap is especially meaty, and this, along with its pleasant flavor, makes the Inky Cap one of the choice forms for the table.

The cap is at first egg-shaped, but elongates considerably with age to 1½ to 3 inches. It is tan to grayish or smoky-brown. The top is generally smooth, but often minute scales or silky fibers cover the surface.

The gills are free from the stem, creamy white in young specimens, becoming pinkish, then black, and finally melting away in inky drops.

The smooth, white stem is hollow, from 3 to 5 inches long, and from ¼ to ¾ inch thick.

The Oyster Mushroom

(Pleurotus ostreatus)

The Oyster Mushroom grows on living trees, stumps, or fallen trunks, never on the ground. It grows in shelved clusters, often overlapping, and the stem, though apparently almost absent, is attached laterally to one side of the cap (figure 6).

The cap is from 2 to 8 inches broad, firm, fleshy, smooth, and shell- or fan-like in shape. The color is most often white, but may be grayish or fawn. The flesh of the cap and the gills is white.

This form is almost universally a favorite among mushroom eaters, but it must be thoroughly cooked or it will be tough.

It is abundant in New York and occurs throughout the summer and as late as December. Several other species of similar appearance also grow on wood and are edible.

FIGURE 6. Pleurotus ostreatus

The Sulphur-Colored Polypore

(Polyporus sulphureus)

FIGURE 7. Polyporus sulphureus

One large group of the fungi has small pores that covers the undersurface of the cap in place of gills. Nearly all such forms are leathery or woody at maturity, and hence, are of little value as food. The Sulphur-Colored Polypore, however, is soft and fleshy when young and prized by many collectors because of its flavor.

It is widely distributed and grows on the wood of living or dead deciduous trees (figure 7).

The caps usually are in clustered, overlapping groups. The individual cap is fan-shaped and, when mature, is marked with radiating ridges which increase this fan-like appearance.

The color of this fungus may be sulphur yellow on both surfaces, but usually the upped surface is a deeper shade of yellow or orange-red.

During late summer and fall, the Sulphur-Colored Polypore is common. It is an easy form for the beginner to identify because of its color.

There are many different umbrella-shaped polypores, but they are difficult to identify and some of them are unfit for food. The beginner should avoid them.

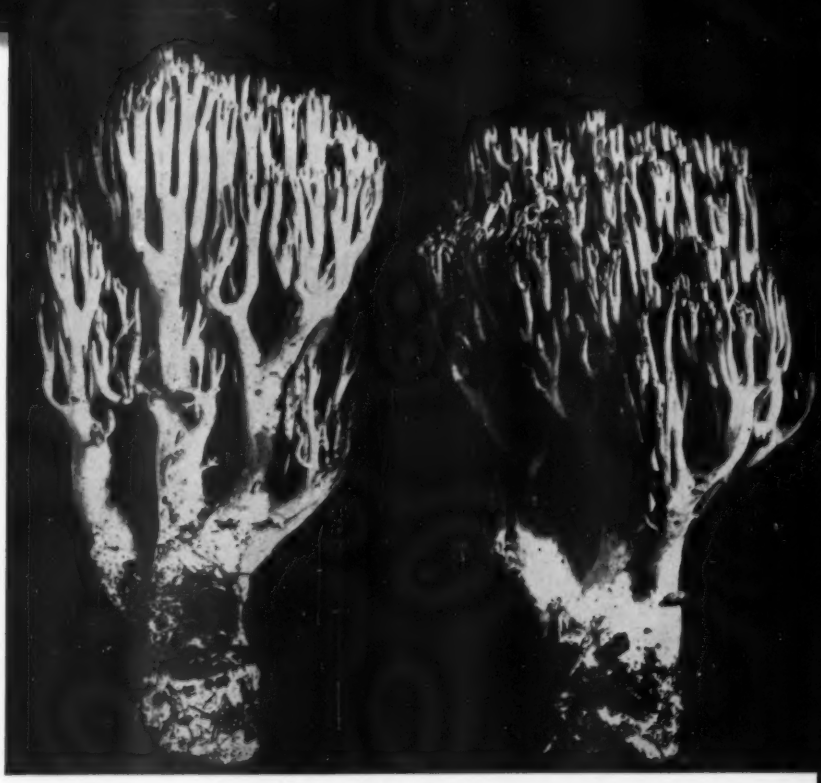

FIGURE 8. Clavaria
This shows the typical branching so characteristic of the coral fungi

The Coral Fungi
(Clavaria)

The Coral Fungi have a distinctive shape quite unlike that of the umbrella-like mushrooms (figure 8). They are called *Coral Fungi* because of their resemblance to ocean coral. Although a few forms in this group are simple, erect, unbranched clubs, most of the species are much branched in a compact tree-like manner. They are often common in woods and are especially attractive in appearance. Some of them are a beautiful coral pink; others are cream-color, fawn-color, or some shade of yellowish or reddish brown. They grow commonly on the ground or on very rotten wood, especially in dense damp woods or deep ravines.

While no member of the group is regarded as poisonous, some of them are said to be poor for eating because they may be tough or bitter, or lack flavor. Their many small branches and characteristic brittleness make them especially easy to use in soups or gravies.

The Giant Puff-Ball

(Calvatia gigantea)

The Giant Puff-Ball is easy to identify. It is so large and characteristic that it could hardly be mistaken for anything else. Usually it is found in the autumn in pastures or other grassy places (figure 9), and in the fresh condition is a prominent white ball as large as a man's head, sometimes much larger. Specimens more than a foot in diameter are not uncommon. The interior is homogeneous and white throughout, not unlike a loaf of bread. As long as it remains white it is edible. As it matures, the interior turns yellow and watery and is then unfit for food; at complete maturity *the interior* is transformed into dry brown powder composed chiefly of millions of spores. The membrane covering the ball finally breaks into pieces, and the spore powder is exposed. The whole ball then soon disintegrates, and the spores are blown away by the wind.

The Giant Puff-Ball is prepared for the table by trimming away the outer firm skin and cutting the soft inner tissue into slices. These are cooked the same as eggplant and the taste is similar to that of eggplant. Although a great quantity of food is provided by a single Giant Puff-Ball, the flavor is less pleasing than that of many mushrooms.

Most other species of puff-balls are rather small.

FIGURE 9. Calvatia gigantea

FIGURE 10. Morchella

The Morels, or Sponge Mushrooms
(Morchella)

The Morels are edible and usually are easy to recognize. The plants have two distinct parts, the cap and the stem (figure 10). The cap varies in shape from round to conical, but it is always marked by rather broad pits, covering the entire outer surface. These pits are separated from each other by ridges that form a network. The cap is usually buff or light ochre-yellow in color, and always hollow.

The stem usually is stout and hollow, and frequently has a granular appearance.

The Morels are sought by all mushroom collectors because of their fine flavor. Their distinctive appearance assures a correct identification. Morels appear only in the spring and the early summer. Usually they prefer damp places in open woods or orchards.

Poisonous Mushrooms — Amanita

A number of different species of mushrooms belonging to the genus *Amanita* are deadly poisonous, and deaths caused by eating them are not infrequent. Eating even a small amount is dangerous. The symptoms of poisoning develop slowly and, in consequence, the physician is often called too late. It is imperative, therefore, that the collector be able to recognize *Amanita.*

In all species of *Amanita* the spores are white. Even in old specimens the gills are usually white. The stem bears a prominent annulus. In the young or button stage, the fruit body differs from that of most other mushrooms in that it is enclosed in a definite membrane. This is called the *volva.* The maturing button enlarges rapidly and bursts the volva; the mushroom emerges from it and pushes upward until well aboveground. The entire membrane is commonly left behind surrounding the base of the stem as a cup. This has been called the *death-cup*, and its presence carries the warning that the mushroom in hand is probably a poisonous species. Sometimes, however, the volva fails to persist as a definite cup at the base of the stem. Instead, it may break into fragments some of which are carried upward on the surface of the cap where they may be seen at maturity as loosely attached scales. When collecting mushrooms, it is a good rule for one to dig to the very base of the stem to determine whether the cup is present or absent. If a cup is not found, then a search should be made for fragments of the volva at the base of the stem and on the surface of the cap.

As a volva is present in all species of *Amanita* and is lacking in most other mushrooms, any indication of its presence should constitute a warning, even though a well-formed cup be absent.

FIGURE 11. Amanita muscaria
The partly expanded plants show death-cup, annulus, white gills, and volva scales on the cap

The Fly Agaric
(Amanita muscaria)

The Fly Agaric, a poisonous form, often grows along roadsides near trees, or in groves, and at the edges of woods.

The cap in the young stages of development is rounded, but at maturity is flat on top (figure 11). It measures from 4 to 8 inches broad. The color varies from a yellow to orange-red, but in old forms it is nearly white. White to yellowish scales which are fragments of the volva often are present on the surface of the cap, but they may be totally absent. The gills and stem are white, and the bulb-like structure at the base usually is marked by prominent concentric scales forming interrupted rings. The stem is from 4 to 8 inches long and from ½ to 1 inch thick.

The Destroying Angel

(Amanita verna)

The Destroying Angel (figure 12) is one of the most poisonous of the mushrooms, and its white color makes it especially dangerous in that it is easily confused with *Lepiota naucina* or *Agaricus campestris*. As it has a prominent death cup, the careful collector will recognize it. Failure to dig to the base of the stem in search of the cup has, however, frequently resulted in disaster. Since the entire volva commonly is used to form the cup, warning scales ordinarily are not present on the surface of the cap as in the Fly Agaric. The cap of the Destroying Angel is bell-shaped when young to fully expanded and flat when mature. It is from 3 to 5 inches broad and pure white in color. It is slimy in wet weather.

A related species, the Deadly Agaric (*Amanita phalloides*), is sometimes white, but more often is yellowish, greenish, or olive brown. In it the death-cup is often less well formed than in the Destroying Angel and there are prominent scales on the cap. Still other poisonous species of *Amanita* differ in color, size, and shape. The death-cup is much more evident in some species than in others.

FIGURE 12. Amanita verna
This is a white form with a prominent death-cup. There are no scales on the surface of the cap

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